X-RAY MOVING PICTURES LATEST AID TO SURGERY

Motion Films of the Heart and Other Organs in Action Soon to Be Used in New York Hospitals—Wonderful Operations Performed With Certainty by X-Ray Help—Lives Preserved and Patients Saved From Deformity

AS EYES to the surgeon is the X-ray machine. It is now one of the most efficient aids to surgery and new wonders are promised through its further development.

For instance Dr. I. Seth Hirsch, an X-ray expert at Bellevue Hospital, has invented a moving picture X-ray apparatus. This will make it possible to present moving pictures of what is going on inside the body. It will show such things as the movements of the heart in beating and the process of the digestion of food. The X-ray moving picture will enable the surgeon to study obscure ailments and devise a remedy.

For a similar reason the X-ray apparatus is found in every large hospital to-day. Once it was frequently necessary for the surgeon to grope when he performed an operation. He knew what the general conditions were, but he was uncertain regarding special complications. The X-ray machine enables him to do his work in such cases with certainty and knowledge.

"If the X-ray machines were removed from the city hospitals," said a surgeon one day last week, "it would almost put the surgeons out of business."

A little exaggerated this, perhaps, but it illustrates the dependence surgeons have come to put on X-rays.

Besides the assistance they give the surgeon in performing an operation there are two other important results derived from the use of X-rays. They save lives and they save from deformity.

Cases of fractured skulls supply instances of one phase of life saving through the use of X-rays. Sometimes the fracture is of such a nature that there are no external evidences of it. Formerly the patient might have gone without proper attention until too late. Now an X-ray picture is taken whenever there is suspicion of a fracture and the trouble can be located at once.

In the last quarter of a century one of the special objects in surgery has come to be, in addition to the saving of life, the prevention of deformity as a result of fractures, bullet wounds and foreign substances in the human body. In the old days the surgeons were satisfied to effect a cure; nowadays they want to make the patient as nearly perfect as he was before his mishap occurred. In this work the X-ray machine is of especial value to the surgeon.

Surgeons say that there are four great epochs in the history of surgery. The first came when Ambroise Paré, the French surgeon, substituted the use of the ligature for the red hot knife and cautery; the second when Morton, the American, demonstrated that human beings could be operated on painlessly under the influence of anæsthics; the third when the late Lord Lister introduced the antiseptic principle in the treatment of wounds. The fourth epoch resulted from Prof. Roentgen's discovery of the X-ray. The Roentgen ray has made surgery much easier to both patient and surgeon. Following are some cases which illustrate its use:

Some Typical Cases.

One patient treated by Dr. Joseph B. Bissell, a visiting surgeon at Bellevue and St. Vincent's hospitals, was a boy who while playing Indian in the street was shot with a revolver thought to contain blank cartridges. The bullet entered the left side, passing dangerously near the heart, liver and kindeys, cut the spinal cord and fractured the sixth rib. To locate the bullet according to the old methods several incisions would have had to be made, thereby increasing the chances of blood poisoning. The X-ray located the bullet very near the skin and only a slight operation was necessary to remove it. The X-ray probably saved this boy's life, but unfortunately he is a cripple, being paralyzed below the waist, with no possible chance of recovery.

Another case was that of a boy who swallowed a nail. He was taken to Bellevue, suffering intense pain and in a critical condition. The X-ray showed that the point of the nail was embedded in the lung. A slight and immediate operation removed the nail and a safe and quick recovery followed.

In another case a man held a scarf-pin between his teeth preparatory to putting it in his tie. A jocular remark made by a member of his household caused him to laugh suddenly, and in doing so he swallowed the pin. He was taken to Bellevue. The X-ray appartus showed exactly where the pin was, and the owner of the pin is to-day wearing it securely fastened in his necktie.

A set of false teeth was swallowed by a man and lodged in the fatty tissues of his abdomen. The X-ray did not show its location very well owing to the soft substances surrounding the set of teeth. Then a dose of oatmeal and bismuth was administered. This caused the stomach and intestines to become black, the contrast enabled the X-ray photographer to locate the teeth and they were removed without trouble.

Another case of teeth swallowing was that of a woman who came to Bellevue Hospital in a high state of excitement bordering on hysteria. Her story was that she went to bed the evening before and forgot to remove her teeth. In the morning, a search failing to find them, she was positive she had swallowed them during the night.

The X-ray failed to locate them and the oatmeal and bismuth scheme was resorted to. Still no teeth. Miss Maude H. Bryson, an X-ray expert connected with the hospital, took her in hand and severely questioned her. She declared the woman must have removed the teeth in her sleep and forgotten where she put them, but the patient was positive that she had swallowed them. She was removed to a ward and while she was being treated for hysteria and was in danger of nervous collapse a member of her household came to Bellevue with the teeth, having found them between two mattresses.

The glad news of the discovery was even more injurious than the belief that she had swallowed the teeth. From the effects of hysteria and the excessive joy and sense of relief over her escape from the operating table she collapsed completely and had to be kept at the hospital over night.

In the location of bullets the X-ray is one of great value in surgery. The position of the bullet is shown accurately and unnecessary incisions are avoided. A full sized picture of the body or limb in the neighborhood of the wound is made, and the surgeons can easily measure from any stated point and remove the leaden pellet.

X-ray pictures of fractured skulls, fractured arms and legs, and malignant growths, such as cancer or tumor, are of great help to the surgeon. In the case of a fractured arm or leg the old practice was to set the limb, put on splints and bandage it, trusting to luck that it might come out all right. If the bones did not unite properly and the patient was unwilling to have the limb broken again and reset he had to go through life with a deformed limb. In shin or thigh bone fractures the limb was usually put in a plaster of paris cast, leaving a hole in the cast to allow a dressing. When the time arrived to cut the cast away it very often happened that something serious was the matter.

In present day surgery the limb is set, bandaged and put in splints, pretty much as of old, but if desirable an X-ray picture can be taken every two days, the uniting of the bones can be observed and if anything goes wrong it can be remedied quickly. Pictures are taken of the interior of the body after an operation and results are watched carefully, thanks to the X-ray.

What is considered one of the most extraordinary cases in which X-rays played a part was that of a man 50 years old, who came to Bellevue in a serious condition, a strain or shock which had weakened the walls of the aorta, the main artery leading to the heart. The heart was very weak, owing to the fact that the aorta had been punctured and that blood which should have reached the heart was trickling through the wall of the aorta. An X-ray picture showed exactly where the trouble was, and the surgeons decided that the remedy lay in strengthening the walls of the aorta with a coil of platinized gold wire.

Twelve feet of the wire was needed, and it was ordered from Philadelphia. Platinized gold wire is a scarce and costly commodity and it took ten days to fill the order. In order to give it the necessary eleasticity the wire was wound around a wooden spool about the diameter of a silver dollar. Then a very delicate operation for aneurism of the aorta was performed without the aid of chloroform or ether, neither of which could be used owing to the weak condition of the patient's heart.

A cocaine spray over the incision answered admirably. The patient was conscious all the time and saw the surgeons working on him for three-quarters of an hour, and at the end asked for a cigarette or a mild cigar. An incision about six inches long was made, the gold wire was inserted in the shape of a spiral spring, making that particular part of the aorta about twice its natural size for about four inches.

Both ends of the wire were then welded to the nearest strands of wire by the aid of electricity. After some further steps which it is unnecessary to describe the operation was completed. It was an entire success. Dr. William C. Lusk performed the operation, assisted by Drs. Becker, Vosburg and R. A. Kempf, who was in charge of the division of the hospital of which the man was a patient. Several surgeons from Cornell and Bellevue Medical colleges were present and carefully watched the surgical feat.

The patient had been over two months in the hospital when the operation was performed and stayed for three months after it. This was necessary, as the patient had to be treated and prepared for the operation and afterward he was put on a special diet and treatment while his case was under careful observation. When he was discharged his chances for a long life were good, provided he put no undue strain on his heart or aorta. Yet his situation left something to be desired. Five months of idleness while he was in the hospital was a severe drain on his finances, he has a wife and large family of young children to support and he cannot return to his previous employment, which was at manual labor.

One Way Lives Are Saved.

The records of the Coroner's office bear testimony to the large number of deaths from fractured skulls which occurred in years gone by in cases in which present day methods would have brought about recoveries. Previously to the use of the X-ray a large percentage of fractures of the skull were not discovered until the patients died and an autopsy was performed. Men whose skulls have subsequently been found to have been fractured have been known to go around and even work for a few days and suddenly to collapse and to die without the doctors being able to determine the trouble. The X-ray does much to prevent such occurrences now.

In every case in which there is suspicion of a fracture of the skull an X-ray picture is taken and when necessary the surgeon gets at work and relieves the pressure on the brain.

When Prof. W. C. Roentgen read his announcement of the discovery of the X-ray at Würzburg, Germany, on January 23, 1896, the news flashed over the world. Bellevue, the oldest and also the largest hospital in the United States, was the first institution in this country to appreciate the importance of the new discovery, and in 1897 it secured X-ray apparatus for the use of surgeons. Later Oscar G. Mason was appointed radiographer and remained in charge until a few years ago, when he resigned on account of old age. Mr. Mason had been official photographer at Bellevue for forty-two years, and his work was a great aid to the surgeons. Mr. Mason did not confine his work to surgical cases, and many photographs of the moon and stars hang on the walls of his studio in the neighborhood of the hospital. He is president of the photographic section of the American Institute, secretary of the American Microscopical Society of New York and a member of the Photographic Society of Philadelphia and the National Geographical Society of Washington. He has been engaged in photography for sixty-two years, has celebrated his eighty-fourth birthday and is still very active.

The X-ray outfit at Bellevue has grown greatly since the first piece of apparatus was installed. Dr. George O'Hanlon, general medical superintendent of Bellevue and Allied Hospitals, took a SUN reporter through the X-ray department of Bellevue, where seven rooms have been turned over to Dr. Hirsch, the radiographer in charge, with Miss Bryson as his assistant. Two rooms are occupied for photographing alone. There is a dark room, two other rooms are used for making photographs from X-ray plates and there are a finishing room and an office where 60,000 plates are filed in specially made cabinets.

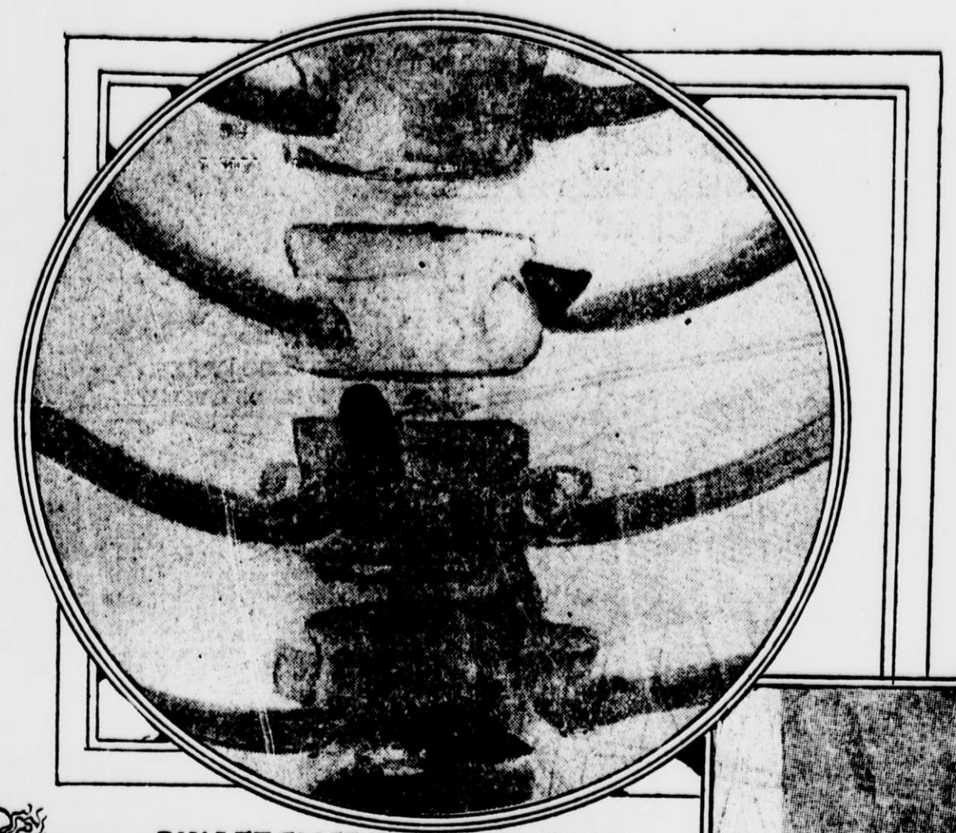
Miss Bryson looks especially after the women patients. She places them in correct pose on the table directly under the X-ray machine, stays alongside of them until a second or so before the picture is taken and then steps behind a leaden wall to escape the rays of the machine. The leaden wall is necessary in order to prevent the operators from coming into contact with the rays of the machine as continual exposure is very dangerous.

From 1897 to 1906 no detailed list of photographic plates or pictures was kept at Bellevue, but for the last six years every picture taken has been carefully tabulated and can be found in a few minutes by the aid of the card system. To show how highly surgeons value the X-ray apparatus it may be noted that in Bellevue the number of pictures taken this year will be more than three times as great as in 1906.

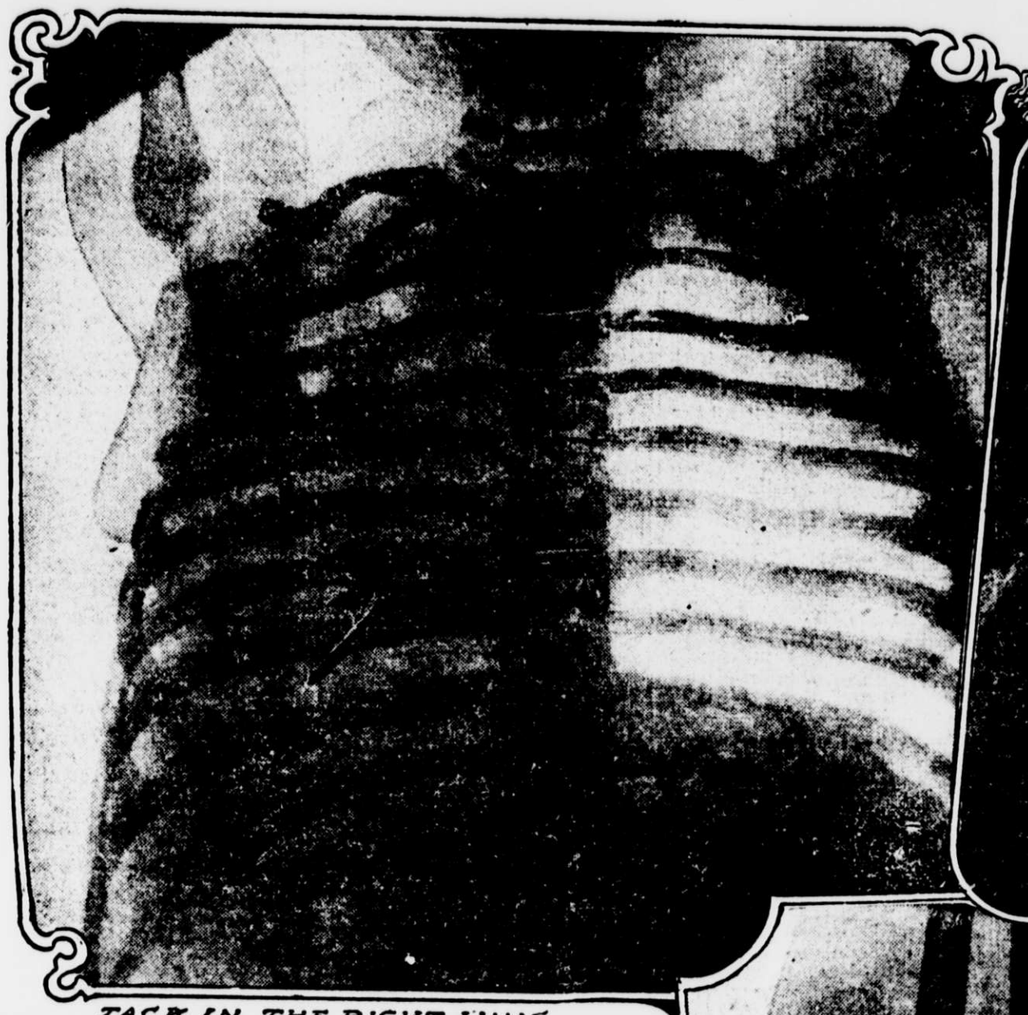
The next step in the development of the X-ray apparatus for medical use may come from the moving picture idea. Dr. Hirsch, who is at present visiting X-ray laboratories in Berlin, Munich and Vienna, has applied for a patent for a moving picture apparatus which will take X-ray photographs at the rate of more than a hundred a minute. This machine will show the pulsations of the heart on a screen, as well as the functions of the kidneys, liver and lungs—something never achieved previously.

A specially prepared screen is placed at the proper distance from the human body, the subject in either an erect or a recumbent position. On this screen is a small window about the size of the organ to be photographed and placed directly over or in front of it. On either side of the window in the screen is a reservoir, one containing the unused film, the other acting as a depository for the film already used.

Back of the screen is a wheel, which on being revolved picks up the film, carries it in front of the window, places it in position, takes the picture and deposits it in its proper place. The highly sensitized film permits the rapid revolution of the wheel back of the window and the outline of the heart expanding and contracting is recorded by the X-ray machine, after the manner of moving pictures.

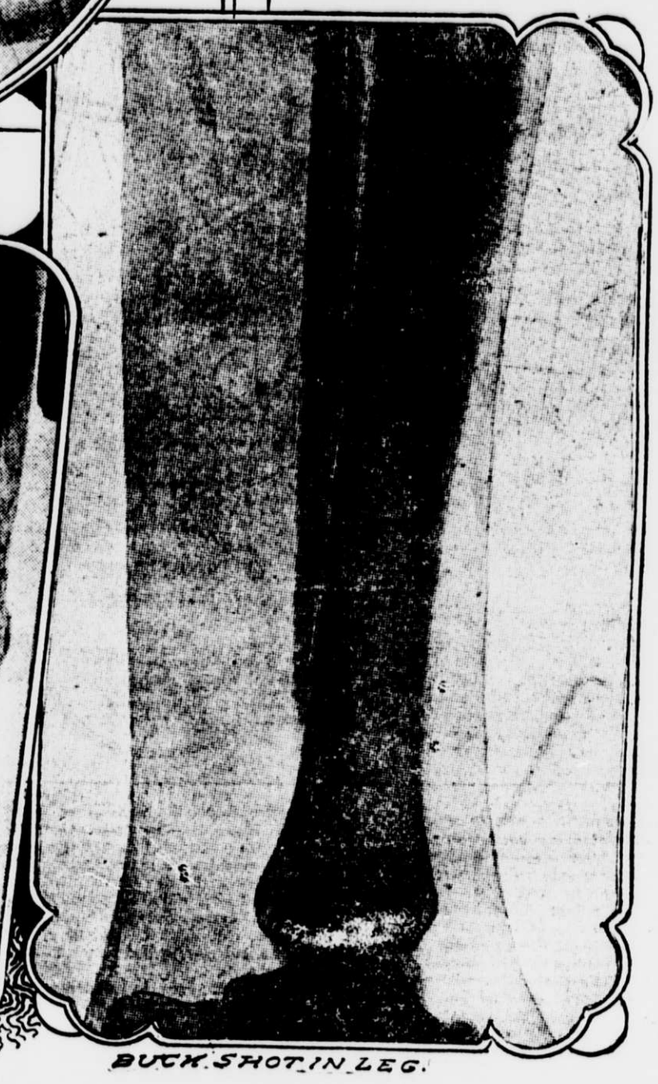


BULLET CLOSE TO SPINE OF CHILD.



TACK IN THE RIGHT LUNG.

THE WAY BROKEN BONES ARE MENDED.



BUCK SHOT IN LEG.

BULLET IN THE LEG.

MAUDE H. BRYSON, REGISTERED NURSE OF X-RAY EXPERT BELLEVUE HOSPITAL.

FASHION DECREES AEROPLANE

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number goes far over the 10,000 mark," said Henry Woodhouse of the Aero Club of America, who keeps tab on aerial happenings. "In the large schools there are always from ten to forty machines in the hangars, and as many aviators are under training passenger carrying is very common.

"The military schools are especially busy in the passenger carrying line. Visiting officers always want the 'air baptême'—and get it. The record for passengers carried in one day is held by the military school of St. Cyr, near Paris. Last January a body of 125 officers visiting the school was given the 'air baptême,' each officer being given one or more flights within thirty-six hours.

"The sportsmen flying for pleasure as a steady thing number about a score in France, half a dozen in America, half a dozen in England, Germany and Italy. The majority are army officers who own their own aeroplanes and use them half for pleasure and half for service. A few others are men who, while not professionals, will gladly compete for prizes, so can hardly be classed as sportsmen.

"The real sportsmen who own aeroplanes and pilot them themselves steadily number only about six, and only three, Senator Emile Reymond, the French Senator, and Etienne Giraud, the well known French sportsman, and Robert J. Collier, the president of the Aero Club of America, are very active at present. Senator Reymond has been using a Bleriot monoplane for two years, and has won an election by flying from place to place canvassing votes. M. Giraud has just ended a 2,000 kilometer tour through France and is starting off with Paul Tissandier, another aviation enthusiast, for a trip to Norway. Mr. Collier holds the double distinction of being the only president of an aero club to own aeroplanes and the first sportsman to own a hydroæroplane and pilot one."

One of the first English women to become interested in aviation was Mrs. Maurice Hewlett, wife of the English novelist. She was the first woman in her country to buy an aeroplane and has the distinction of being the only one of her sex to establish a school.

After Mrs. Hewlett had made up her mind to fly an aeroplane she wrote to a number of French manufacturers, only to receive discouraging answers about the science of flying and how it could be taught. So she set up a place at Mourmelon and determined to learn everything herself that she might impart it to others. She secured as a partner M. Biondeau, a French engineer of experience and ability. In buying the aeroplane only one person could be taught and M. Blondeau took the lessons. The Hewlett-Blondeau school opened up with four pupils, one being Mrs. Hewlett. She has taken her little daughter up in the Blue Bird, the name she has given her aeroplane.

Mrs. Hewlett describes learning to fly as a dreadful experience and even confesses to having shed tears. "Oh, it was a cold, starved time," she said. "The place was enough to damp my ardor, the cold and wet from January were intense; my crying then was not from excitement, but from cold feet, the result of standing about on that windswept plain waiting for something to happen. The cold feet grievance was remedied as soon as I got over my vanity and took to 'gouties.'"

Mrs. Hewlett also says with pride that her school was the first in England to graduate a pupil. "He was a Frenchman too," she added.